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ABSTRACT

The study described in this report investigated the effects of two context variables on small-group learning--namely, group size and group gender composition--within an adult learning framework. In the study, the "revolving circle" method was innovated. In this design, one group member is the center of the cooperative circle and all discussions are around his/her task completion. The method was implemented for a period of 2 months, 4 hours per week in seven different classrooms in Haifa, Israel, taught by four teachers in literature and language arts. Students in each class were randomly assigned to groups of different size (three, four, or five group members) and different gender composition (majority male or female). Two trained female observers watched each classroom for six full periods of 90 minutes each, and coded behavior for 5 minutes using a checklist. Observed behaviors were grouped in six categories: listening and social interaction, group maintenance, interactive summary, giving and requesting information, cooperative learning behaviors, and general learning behaviors. The study found that most of the significant differences occurred in odd-number groups. Groups of three members elicited more integrative summary and general learning behaviors, while groups of five members elicited more cooperative learning behaviors, listening, and social interaction. The study also found that cooperative learning behavior was significantly higher in groups with either gender majority, while giving information was highest in equal gender composition groups. The results of the study can be used in further research on group learning behavior. (KC)

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ADULTS IN COOPERATIVE LEARNING: EFFECTS OF GROUP SIZE AND GROUP GENDER COMPOSITION ON GROUP LEARNING BEHAVIORS

(a summary)

Paper presented at the annual meeting of the American Educational Research Association in San Francisco, April 1986.

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Adults in Cooperative Learning: Effects of Group-size and Group Gender-composition on Group Learning Behaviors

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Objectives and perspectives

The present study investigated the effects of two context variables on small-group learning, namely group size and group gender composition, within an adult learning framework.

Cooperative learning is designed to emphasize and integrate the social and cognitive elements of instruction and learning. Through the restructuring of teachers' and students' roles and the redesigning of learning tasks into divisable subtasks with interdependence among group members, cooperative learning has resulted in the growth of students' academic achievements and social relationships (Sharan, Hare, Webb, & Hertz-Lazarowitz, 1979; Slavin, 1983; Slavin, Sharan, Kagan, Hertz-Lazarowitz, Webb, & Schmuck, 1985). Research on cooperative learning has included a wide range of pupil ages, cultures, and ethnic backgrounds, as well as variety of experimental methods. Overall, a general positive and encouraging body of research has accumulated. The field, however, is still limited in a precise understanding of the internal dynamics and contextual variables of group learning that contribute to the documented general positive effect. Traditionally, social-psychological concepts, such as motivation, group reward structures, peer-pressure, and positive interdependence, have been used in a general way as explanatory concepts.

The present study addresses the paucity of research on internal group learning dynamics, and offers a detailed description of such behaviors. In addition, this work represents the first such research on adult learners.

Method

Subjects . 93 students enrolled in an adult-education program in Israel were instructed for two months in a cooperative learning setting. The sample included 36 males and 57 females. The participants ranged in age from 17 to 71 years, with the majority (65%) being between 17-38 years old. Most of the students participated in the program 2-3 evenings per week each week for one full year. The students, all working adults, came from diverse ethnic and low-middle to middle socio-economic class backgrounds.

Cooperative-learning (C-L) in the classroom. In the present study, the Group-Investigation (Sharan & Hertz-Lazarowitz (1978, 1979) and Jigsaw (Aronson et al., 1978) methods of cooperative learning were integrated, and the Revolving Circle method was innovated. The following elements were included: division of learning units into mini-tasks with the option for each group member to choose his/her part and specialize in an individual task; peer-tutoring, peer discussion, group summary, formation of a new problem related to the content of the learning unit; group investigation, and consensus and integrative solutions to the problem. In each phase of the learning, one member is in the center of the cooperative circle and all discussions are around his/her task completion, in this way, each of the 3-5 members became at the one time the center of the revolving circle. The group task is combined on all the parts of the individuals and the addition of the group suggestion, clarifications and opinions.

The method was implemented for a period of 2 months, 4 hours per week in 7 different classrooms, taught by 4 teachers in the content areas of literature and language arts. The classrooms were small (9-21 students) and although students could be enrolled in more than one class, the same teacher always taught the same students during the experiment.

Design and data collection. Students in each class were randomly assigned to groups of different size (3,4, of 5 group members) and different gender composition. Due to the small group size, variation in gender composition was decided in 3- and 5- member groups by a simple majority of males or females. This design was followed as closely as possible in a field-experiment where weekly changes had to be made following student absences.

Two trained female observers, graduate students in education and familiar with cooperative learning methods, observed each classroom for 6 full periods, lasting 90 minutes each. Each group was observed each lesson period for nine cycles of 10 minutes. Five minutes of the interactions and behaviors of each group member were coded using a pencil and paper checklist of predetermined categories, and five minutes were full transcribed by the observer. In this way, the naturalistic flow of the group was also recorded. The data presented in this paper is based on the checklist observations, including 5022 units of group learning behaviors and interactions.

Coding reliability, between the observers, and between the observers and the principal researchers was high (.85) and was calculated on four occasions during the experiment (during the rotation of each observers between groups and classrooms).

The teachers were trained to use the Revolving Circle method and visits to their classes by experts ensured that they implemented the method properly. The students were partially acquainted with the method, but had never before used it intensively and in a structured environment.

Observational measures included 13 behavioral categories based on research in group learning and whole-class learning research (Hertz-Lazarowitz, 1983a, 1983b; Hertz-Lazarowitz et al, 1984; Webb, 1985; Wilkinson, 1982). These categories grouped to six factors: (a) listening and social interaction - included listening to a group member and interacting verbally during social events not related to the learning task; (b) group maintenance - included all verbal interactions that were aimed at facilitation of the group task and social function, i.e., "now it is your turn to express your opinion," "maybe it's better for us to go this way in the summary"; (c) interactive summary - included verbal and/or written behaviors aimed at facilitation of a whole-group product--flow of ideas related to a problem solving process, contribution of sentences to a summary, etc.; (d) giving and requesting information - included articulated giving of information (not in the tutoring phase of the method) and requesting it, e.g., "I'll say it again to you...", "please help me with this paragraph", (e) cooperative learning behaviours - included all verbal interactions that were on-task and referred to at least one group mate, such as reading aloud for the group, tutoring, discussing, exchanging information and ideas; and (f) general learning behaviors - included mainly reading and writing during individual seatwork. Usually those general learning behaviors were in preparation for the onset of cooperative learning behaviors.

Results

The sum of all the observational data in the classrooms were subjected to Analyses of Variance. Since no significant differences emerged between observation times (1-6) and classes, the data were collapsed across those two variables. The first ANOVA tested for the effect of group size (3) on group learning behavioral factors. Results indicated that four of the six factors were significantly affected by group size. Table 1 presents the means and standard deviations of this analysis. Listening and social interaction were most frequent ($p<.004$) in large groups (N=5). Integrative summary was most frequent in small groups (N=3, $p<.001$), cooperative learning behaviors was most frequent in large groups ($p<.001$), and general learning behaviors was most frequent in small groups ($p<.01$). One can summarize that most of the significant differences are in odd number groups. Groups of 3 members elicited more integrative summary and general learning behaviors, while groups of 5 members elicited more cooperative learning behaviors, listening and social interaction.

The second ANOVA tested the effects of group gender composition (mostly male, equal and mostly female) on group learning behavioral factors. In this analysis, only two factors were significantly affected by gender composition. Cooperative learning behavior was significantly higher in groups with either gender majority ($p<.005$) giving information was highest in equal gender composition ($p<.001$). Generally, group gender composition did not affect behavior categories but some interesting trends emerged.

Discussion

The results of the present study contribute to a better understanding of the internal group learning dynamics in cooperative learning. In calculating the

percentage of behaviors based on mean proportions, it was found that even in cooperative learning groups, up to 40% of all learning behaviors are general and not unique to cooperative learning. Listening and social interaction contribute an additional 20%, and each of the other 4 behavioral facators add 10%. Thus, the cooperative elements of group learning are focused on cooperative learning behaviors, asking and requesting information, and interactive summary. Further research might do well to focus more closely on each of these factors.

The effect of group size and group composition on in-group learning behaviours is a continuation of earlier work by Webb (1985). Results indicated here that only 2 factors were significantly effected by gender composition, cooperative learning behaviors were more frequent in non-equal gender composition, while the contrary was in giving and requesting information. Size groups effected 4 out of 5 factors, generating groups of 3 or 5 members elicited more internal learning behaviors. This information may be important for researchers and field practitioners as well.

Table 1

Cooperative learning behaviors in three group sizes[1]

Behavioural Factors		Group Size				
		3 members (N=224)	4 members (N=156)	5 members (N=178)	F value	SIG
Listening and Social Interaction	M	0.68	0.77	1.00	5.45	0.004
	SD	(.89)	(.96)	(1.14)		
Group Maintenance	M	0.33	0.45	0.40	2.03	N.S.
	SD	(.47)	(.70)	(1.65)		
Interactive Summary	M	0.59	0.46	0.19	5.11	0.006
	SD	(1.45)	(1.46)	(.58)		
Cooperative Learning Behaviors	M	0.43	0.35	0.58	7.79	0.0005
	SD	(.52)	(.46)	(0.65)		
Giving and Requesting Information	M	0.51	0.56	0.48	0.65	N.S.
	SD	(.57)	(.81)	(.53)		
General Learning Behaviors	M	1.68	1.61	1.42	4.45	0.01
	SD	(.88)	(.89)	(.91)		

[1] Notes = Range is 0-9

N = 558 observations

Table 2

Cooperative learning behaviors in different gender composition groups[1]

Behavioral Factors		Group Composition				
		Majority Males	Majority Females	Equal	F value	SIG
		(N=165)	(N=348)	(N=45)		
Listening and Social Interaction	M	0.90	0.79	0.62	1.58	N.S.
	SD	(1.00)	(1.01)	(.93)		
Group Maintenance	M	0.56	0.37	0.56	2.09	N.S.
	SD	(.56)	(.60)	(.73)		
Interactive Summary	M	0.38	0.41	0.73	1.45	N.S.
	SD	(1.04)	(1.24)	(1.86)		
Cooperative Learning Behaviors	M	0.50	0.45	0.28	2.86	0.05
	SD	(.56)	(.55)	(.42)		
Giving and Requesting Information	M	0.43	0.52	0.77	4.80	0.08
	SD	(.56)	(.63)	(1.09)		
General Learning Behaviors	M	1.54	1.61	1.48	0.55	N.S.
	SD	(.91)	(.96)	(.85)		

Notes: Range is 0-9

N=555 observations

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